REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
E	Added class K devices. Redrew entire document. -sld	98-02-23	K. A. Cottongim
F	Updated drawing to reflect the current requirements of MIL-PRF-38534. -sld	03-07-31	Raymond Monnin
G	Table I; For the Input-output insulation current test (I_{I-O}), under the condition block changed "45 percent RH " to "RH ≤ 65 %". Editorial changes throughout. -sld	04-10-21	Raymond Monnin

REV																				
SHEET																				
REV																				
SHEET																				

REV STATUS	REV	G	G	G	G	G	G	G	G	G	G	G	G		
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11	12		

PMIC N/A

PREPARED BY
Steve L. Duncan

CHECKED BY
Robert M. Heber

APPROVED BY
William K. Heckman

DRAWING APPROVAL DATE
90-09-28

REVISION LEVEL
G

DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43218-3990
http://www.dscc.dla.mil

STANDARD MICROCIRCUIT DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

MICROCIRCUIT, HYBRID, LINEAR, SINGLE CHANNEL, OPTOCOUPLER, TRANSISTOR OUTPUT

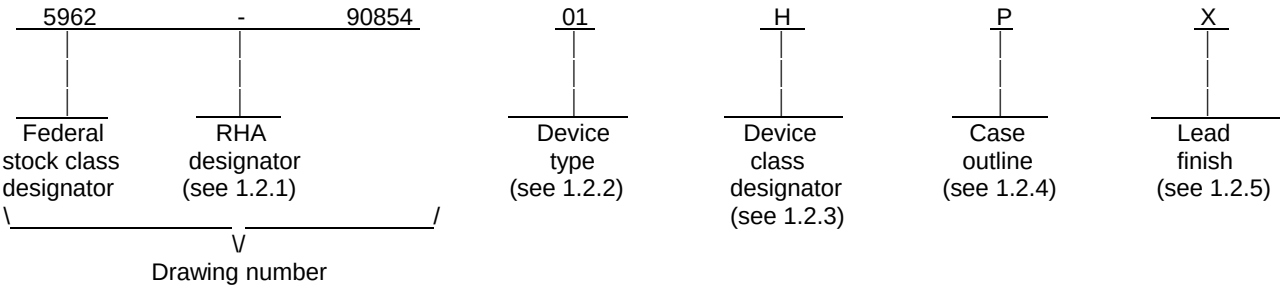
SIZE	CAGE CODE	
A	**67268**	**5962-90854**

SHEET 1 OF 12

1. SCOPE

1.1 Scope. This drawing documents five product assurance classes as defined in paragraph 1.2.3 and MIL-PRF-38534. A choice of case outlines and lead finishes which are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness assurance levels are reflected in the PIN.

1.2 PIN. The PIN shall be as shown in the following example:



1.2.1 Radiation hardness assurance (RHA) designator. RHA marked devices shall meet the MIL-PRF-38534 specified RHA levels and shall be marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 Device type(s). The device type(s) identify the circuit function as follows:

Device type	Generic number	Circuit function
01	HCPL-5501, HCPL-550K, 66126-105, 66126-300	Transistor output, single channel optocoupler

1.2.3 Device class designator. This device class designator shall be a single letter identifying the product assurance level. All levels are defined by the requirements of MIL-PRF-38534 and require QML Certification as well as qualification (Class H, K, and E) or QML Listing (Class G and D). The product assurance levels are as follows:

Device class	Device performance documentation
K	Highest reliability class available. This level is intended for use in space applications.
H	Standard military quality class level. This level is intended for use in applications where non-space high reliability devices are required.
G	Reduced testing version of the standard military quality class. This level uses the Class H screening and In-Process Inspections with a possible limited temperature range, manufacturer specified incoming flow, and the manufacturer guarantees (but may not test) periodic and conformance inspections (Group A, B, C and D).
E	Designates devices which are based upon one of the other classes (K, H, or G) with exception(s) taken to the requirements of that class. These exception(s) must be specified in the device acquisition document; therefore the acquisition document should be reviewed to ensure that the exception(s) taken will not adversely affect system performance.
D	Manufacturer specified quality class. Quality level is defined by the manufacturers internal, QML certified flow. This product may have a limited temperature range.

1.2.4 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
P	CDIP2-T8	8	Dual-in-line
X	See figure 1	8	Dual-in-line
Y	See figure 1	8	Dual-in-line

1.2.5 Lead finish. The lead finish shall be as specified in MIL-PRF-38534.

1.3 Absolute maximum ratings. 1/

Supply voltage range (V_{CC})	-0.5 v dc to +20 V dc
Peak forward input current ($t \leq 1.0$ ms)	40 mA
Average input forward current (I_{FAVG})	20 mA
Reverse input voltage (V_R)	3.0 V dc
Output current (I_O):	
Average	8.0 mA
Peak	16 mA
Output voltage range (V_O)	-0.5 V dc to +20 V dc
Emitter base reverse voltage (V_{EBO})	3.0 V dc
Base current (I_B)	5.0 mA
Power dissipation (P_D):	
Input	36 mW
Output	50 mW
Lead temperature (soldering, 10 seconds)	+260°C
Storage temperatue range	-65°C to +150°C
Thermal resistance, junction-to-case (θ_{JC}):	
Case outline P	See MIL-STD-1835
Case outlines X and Y	28°C/W
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	2.0 V dc to 18 V dc
Low Level input current (I_{FL})	250 μA maximum
High level input current range (I_{FH})	12 mA to 20 mA
Operating temperature range (T_A)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.
MIL-STD-1835 - Interface Standard for Electronic Component Case Outlines.

1/ Stresses above the absolute maximum ratings may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or www.dodssp.daps.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item performance requirements for device classes D, E, G, H, and K shall be in accordance with MIL-PRF-38534. Compliance with MIL-PRF-38534 shall include the performance of all tests herein or as designated in the device manufacturer's Quality Management (QM) plan or as designated for the applicable device class. The manufacturer may eliminate, modify or optimize the tests and inspections herein, however the performance requirements as defined in MIL-PRF-38534 shall be met for the applicable device class. In addition, the modification in the QM plan shall not affect the form, fit, or function of the device for the applicable device class.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.4 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Schematic diagram. The schematic diagram shall be as specified on figure 3.

3.2.4 Test circuit and waveforms. The test circuit and waveforms shall be as specified on figure 4.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full specified operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are defined in table I.

3.5 Marking of device(s). Marking of device(s) shall be in accordance with MIL-PRF-38534. The device shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's vendor similar PIN may also be marked.

3.6 Data. In addition to the general performance requirements of MIL-PRF-38534, the manufacturer of the device described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, for each device type listed herein. Also, the data should include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DSCC-VA) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance (original copy) submitted to DSCC-VA shall affirm that the manufacturer's product meets the performance requirements of MIL-PRF-38534 and herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

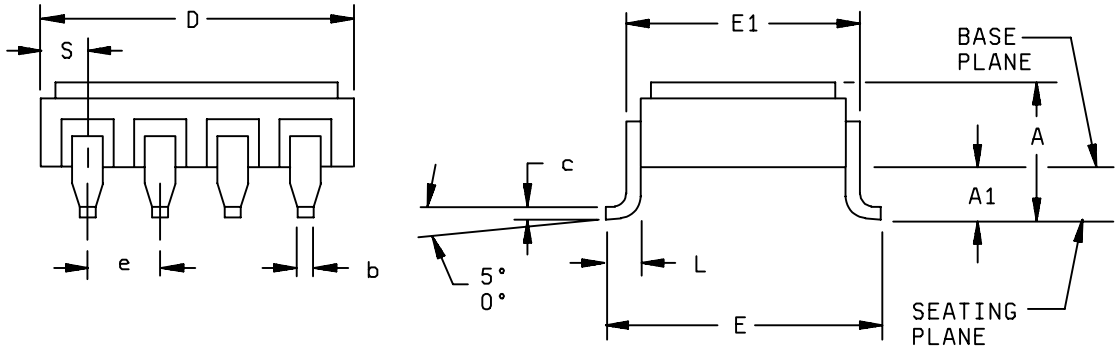
TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Current transfer ratio 1/	CTR	I_F = 16 mA, V_O = 0.4 V, V_{CC} = 4.5 V	1,2,3	01	9.0		%
Logic high output current	I_{OH}	$V_O = V_{CC}$ = 18 V, I_F = 250 µA	1,2,3	01		250	µA
Logic low supply current	I_{CCL}	V_{CC} = 18 V, I_F = 20 mA	1,2,3	01		200	µA
Logic high supply current	I_{CCH}	V_{CC} = 18 V, I_F = 0 mA	1,2,3	01		10	µA
Input forward voltage	V_F	I_F = 20 mA	1,2,3	01		1.9	V
Input reverse breakdown voltage	V_{BR}	I_R = 10 µA	1,2,3	01	3.0		V
Input-to-output isolation 2/ leakage current	I_{I-O}	V_{I-O} = 1500 V dc , T_A = +25°C, RH ≤ 65%, t = 5.0 seconds	1	01		1.0	µA
Propagation delay time to logic high at output	t_{PLH}	R_L = 8.2 k Ω, C_L = 50 pF, I_F = 16 mA, V_{CC} = 5.0 V, See figure 3	9,10,11	01		6.0	µs
Propagation delay time to logic low at output	t_{PHL}	R_L = 8.2 k Ω, C_L = 50 pF, I_F = 16 mA, V_{CC} = 5.0 V, See figure 3	9,10,11	01		2.0	µs

1/ Current transfer ratio is defined at the ratio of output collector current, I_O, to the forward LED input current, I_F, times 100 percent. CTR is known to degrade slightly over the unit's lifetime as a function of input current, temperature, signal duty cycle, and system time. In short, it is recommended that designers allow at least 20 to 25 percent guardband for CTR degradation.

2/ Device considered a two-terminal device: Pins 1 through 4 are shorted together , and pins 5 through 8 are shorted together.

Case outline X

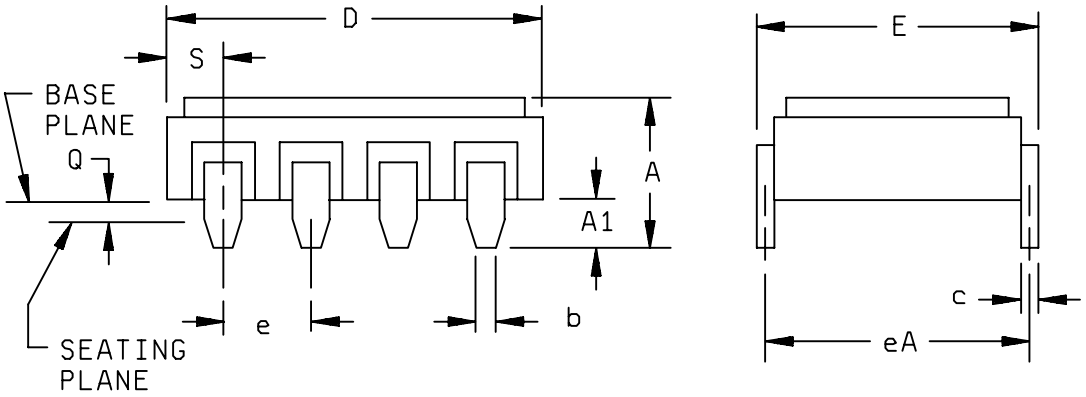


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		4.57		.180
A1	1.40	1.65	.055	.065
b	0.41	0.51	.016	.020
c	0.18	0.33	.007	.013
D	9.40	9.91	.370	.390
e	2.29	2.79	.090	.110
E	9.65	9.91	.380	.390
E1		8.13		.320
L	1.07	1.32	.042	.052
S	0.89	1.27	.035	.050

NOTES:
1. The U.S. government preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin 1 is indicated by the ESD triangle marked on top of the package.

FIGURE 1. Case outline.

Case outline Y



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		4.32		.170
A1	1.14	1.40	.045	.055
b	0.41	0.51	.016	.020
c	0.18	0.33	.007	.013
D	9.40	9.91	.370	.390
e	2.29	2.79	.090	.110
E		8.13		.320
eA	7.37	7.87	.290	.310
Q	0.51		.020	
S	0.89	1.27	.035	.050

NOTES:
1. The U.S. government preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin 1 is indicated by the ESD triangle marked on top of the package.

FIGURE 1. Case outlines - Continued.

Device type	01
Case outlines	P, X, and Y
Terminal numbers	Terminal connections
1	NC
2	$+V_F$
3	$-V_F$
4	NC
5	GND
6	V_O
7	V_B
8	V_{CC}

FIGURE 2. Terminal connections.

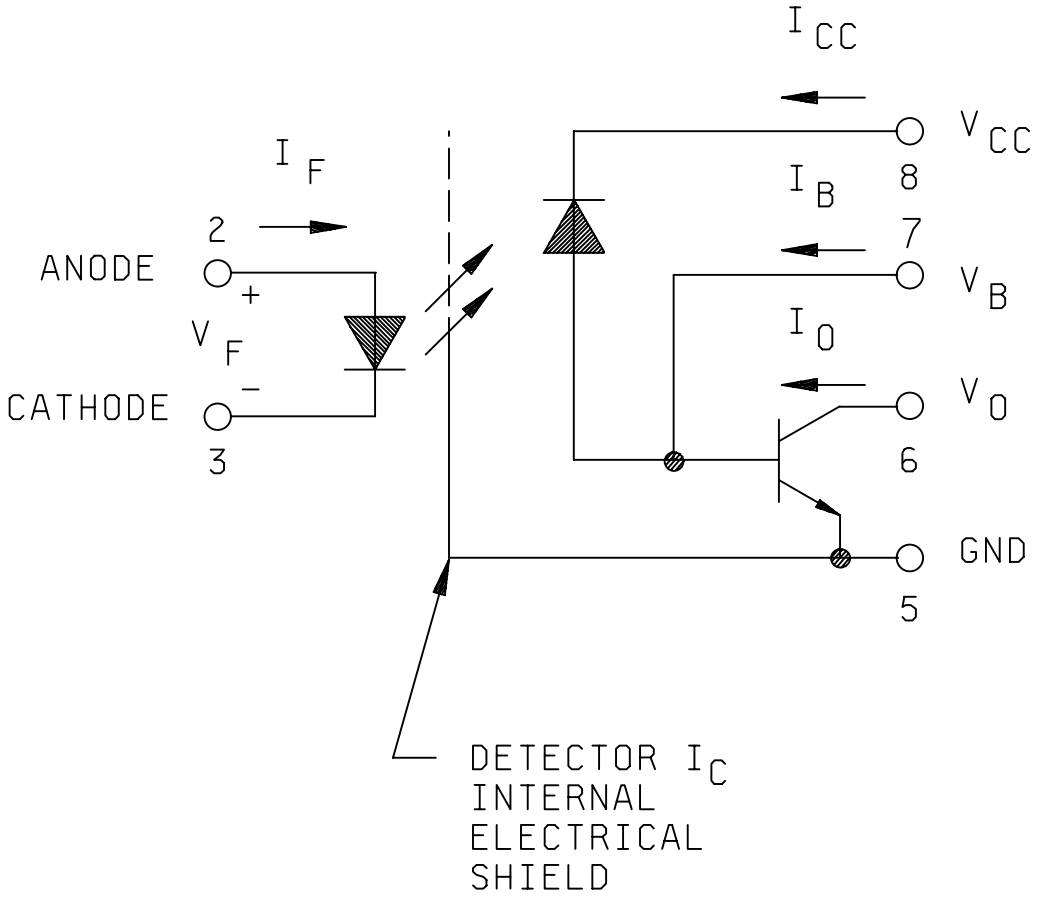
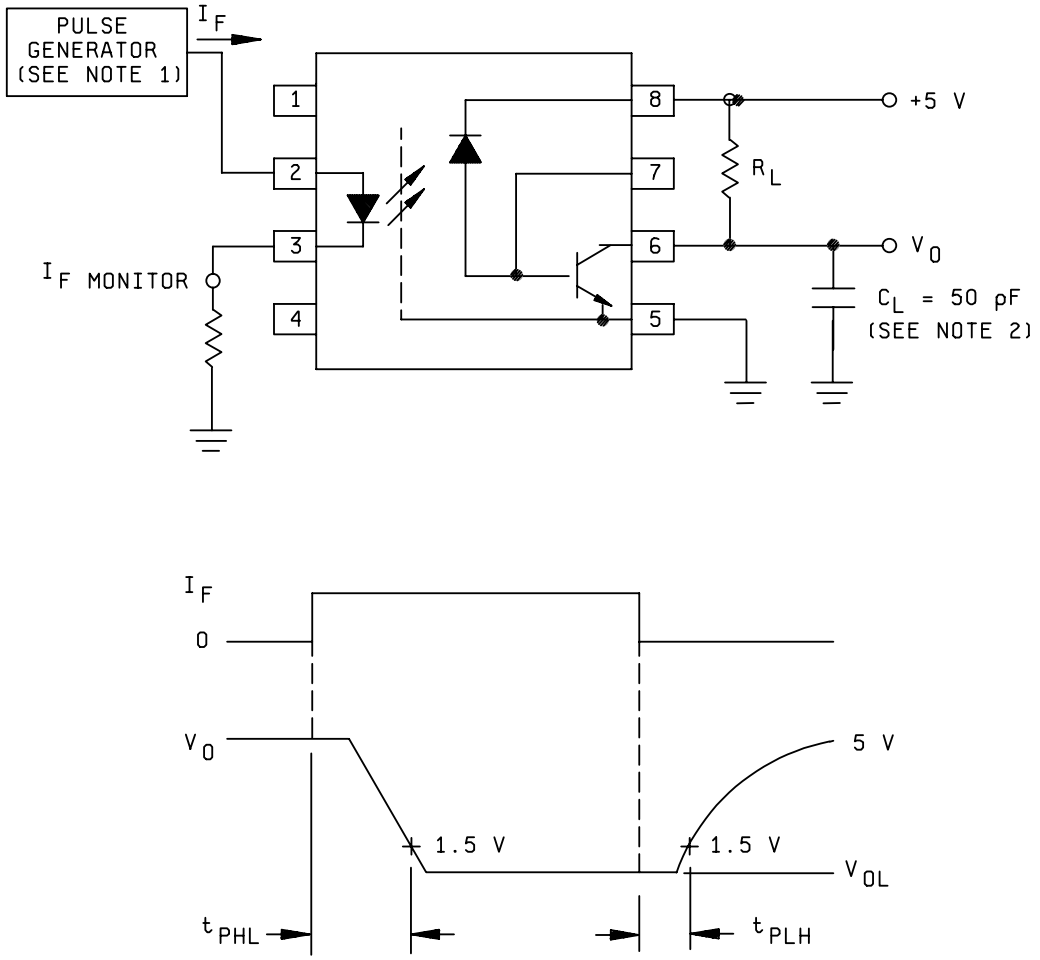


FIGURE 3. Schematic diagram.



NOTES:

1. Pulse generator having the following characteristics: Z_O = 50 Ω, $t_r = t_f$ = 5 ns, 1/f < 100 microseconds, 10 percent duty cycle.
2. C_L = 50 pF and includes probe and stray wiring capacitance.

FIGURE 4. Test circuit and waveforms.

TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	1
Final electrical parameters	1*, 2, 3, 9
Group A test requirements	1, 2, 3, 9, 10, 11
Group C end-point electrical parameters	1, 2, 3
End-point electrical parameters for Radiation Hardness Assurance (RHA) devices	Not applicable

* PDA applies to subgroup 1.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.

(2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Conformance and periodic inspections. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, 6, and 7 shall be omitted.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.

(2) T_A as specified in accordance with table I of method 1005 of MIL-STD-883.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with MIL-PRF-38534.

4.3.5 Radiation Hardness Assurance (RHA) inspection. RHA inspection is not currently applicable to this drawing.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated as specified in MIL-PRF-38534.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus (DSCC) when a system application requires configuration control and the applicable SMD. DSCC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-1081.

6.6 Sources of supply. Sources of supply are listed in MIL-HDBK-103 and QML-38534. The vendors listed in MIL-HDBK-103 and QML-38534 have submitted a certificate of compliance (see 3.7 herein) to DSCC-VA and have agreed to this drawing.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 04-10-21

Approved sources of supply for SMD 5962-90854 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revisions. MIL-HDBK-103 and QML-38534 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This information bulletin is superseded by the next dated revisions of MIL-HDBK-103 and QML-38534.

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-9085401HPA	31757 50434	66126-105 HCPL-5501#200
5962-9085401HPC	31757 50434	66126-105 HCPL-5501
5962-9085401HYA	50434	HCPL-5501#100
5962-9085401HYC	50434	HCPL-5501#100
5962-9085401HXA	31757 50434	66126-105J HCPL-5501#300
5962-9085401HXC	31757	66126-105J
5962-9085401KPA	31757 50434	66126-300 HCPL-550K#200
5962-9085401KPC	31757 50434	66126-300 HCPL-550K
5962-9085401KYA	50434	HCPL-550K#100
5962-9085401KYC	50434	HCPL-550K#100
5962-9085401KXA	31757 50434	66126-300J HCPL-550K#300
5962-9085401KXC	31757	66126-300J

1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the Vendor to determine its availability.

2/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number	Vendor name and address
31757	Micropac Industries, Incorporated 905 E. Walnut Street Garland, TX 75040 Point of contact: Microcircuit Division
50434	Agilent Technologies 350 West Trimble Road San Jose, CA 95131